[0115] CLAIMS

We claim:

1 1. A method of optically patterning a photomask using a direct write continuous wave
2 laser, comprising:
3 a) applying an organic antireflection coating over a metal-containing layer;
4 b) applying a chemically-amplified positive tone or negative tone DUV
5 photoresist over said organic antireflection coating;
6 c) post apply baking said DUV photoresist over a temperature ranging from
7 about 105 °C to about 115 °C;
8 d) exposing a surface of said DUV photoresist to radiation from said direct
9 write continuous wave laser; and
10 e) post exposure baking said DUV photoresist over a temperature ranging
11 from about 70 °C to about 90 °C.

1 2. The method of Claim 1, wherein said organic antireflective coating contains a
2 material selected from the group consisting of a negative photoresist containing a DUV dye,
3 a polymeric material prepared from acrylic polymers or copolymers, a binder resin
4 combined with an acid or thermal acid generator and a photoacid generator compound, a
5 binder resin having pendant phenyl groups, and combinations thereof.

1 3. The method of Claim 2, wherein said organic antireflective coating includes a
2 material selected from the group consisting of hydroxyalkyl acrylate or methacrylate,
3 hydroxycycloalkyl acrylate or methacrylate, hydroxyalkylcycloalkyl acrylate or
4 methacrylate, glycidyl methacrylate, and combinations thereof.

1 4. The method of Claim 1, wherein said chemically-amplified DUV photoresist

2 contains an onium salt metal halide complex.

1 5. The method of Claim 1, or Claim 2, or Claim 3, or Claim 4, wherein said direct
2 write continuous wave laser operates at a wavelength of 244 nm or 257 nm.

1 6. The method of Claim 5, wherein said wavelength is 257 nm.

1 7. The method of Claim 5, wherein said post exposure baking is carried out at least one
2 hour after exposing of said DUV photoresist to radiation.

1 8. A method of optically patterning a photomask using a direct write continuous
2 wave laser, comprising:
3 a) applying or creating an inorganic antireflection coating over a metal-
4 containing layer;
5 b) applying an organic antireflection coating over said inorganic
6 antireflection coating;
7 c) applying a chemically-amplified positive tone or negative tone DUV
8 photoresist over said organic antireflection coating;
9 d) post apply baking said DUV photoresist over a temperature ranging from
10 about 105 °C to about 115 °C;
11 e) exposing a surface of said DUV photoresist to radiation from said direct
12 write continuous wave laser; and
13 f) post exposure baking said DUV photoresist over a temperature ranging
14 from about 70 °C to about 90 °C.

1 9. The method of Claim 8, wherein said inorganic antireflection coating is selected
2 from the group consisting of chrome oxynitride, titanium nitride, silicon nitride,

3 molybdenum silicide, and combinations thereof.

1 10. The method of Claim 8, wherein said organic antireflective coating contains a
2 material selected from the group consisting of a negative photoresist containing a DUV dye,
3 a polymeric material prepared from acrylic polymers or copolymers, a binder resin
4 combined with an acid or thermal acid generator and a photoacid generator compound, a
5 binder resin having pendant phenyl groups, and combinations thereof.

1 11. The method of Claim 10, wherein said organic antireflective coating includes a
2 material selected from the group consisting of hydroxyalkyl acrylate or methacrylate,
3 hydroxycycloalkyl acrylate or methacrylate, hydroxyalkylcycloalkyl acrylate or
4 methacrylate, glycidyl methacrylate, and combinations thereof.

1 12. The method of Claim 8, wherein said chemically-amplified DUV photoresist
2 contains an onium salt metal halide complex.

1 13. The method of Claim 8, or Claim 9, or Claim 10, or Claim 11, wherein said direct
2 write continuous wave laser operates at a wavelength of 244 nm or 257 nm.

1 14. The method of Claim 13, wherein said wavelength is 257 nm.

1 15. The method of Claim 13, wherein said post exposure baking is carried out at least
2 one hour after exposing of said DUV photoresist to radiation.